ON SOME PLANKTON ANIMALS COLLECTED BY THE SYUNKOTU-MARU IN MAY-JUNE 1954 -II. SHELLS OF ATLANTIDAE (HETEROPODA)-

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ON SOME PLANKTON ANIMALS COLLECTED BY THE SYUNKOTU-MARU IN MAY-JUNE 1954

II. SHELLS OF ATLANTIDAE (HETEROPODA)[1)]

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With Plates XV–XVI and 5 Text-figures

The following six species were found in the material:

Species	Individual number	Percentage
1. *Atlanta peroni*	21	27
2. *Atlanta gaudichaudi*	2	2
3. *Atlanta inclinata*	7	9
4. *Atlanta lesueuri*	37	47
5. *Atlanta inflata*	3	4
6. *Atlanta turriculata*	8	10
7. Damaged individual	1	1
	79	

All these species have been described repeatedly and already reported from the Indo-Pacific. However, to perfect our knowledge about the distribution of these pelagic shells I wish to record here the stations where these species occurred and to make my identification of these species credible I am going to give figures and data of measurements of each species in the following.

In descriptions of various species of this family, the relative breadth of the spire compared with the body-whorl is taken up as an important characteristic for the identification. However, I have scarcely been able to find the numerical representation of this character. Here, I offer the following method on trial:—

A...Long diameter of the shell, excluding the keel.

B...Diameter of the spire on the axis on which A is measured.

C...Diameter of the spire, excluding the penultimate-whorl, on the axis on which A and B are measured.

1) Contributions from the Seto Marine Biological Laboratory, No. 256.

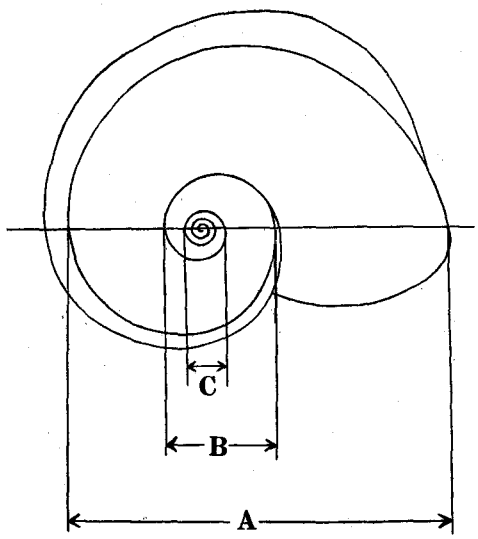

Fig. 1. Diagram showing the way of measurements for the whorl formula.

Whorl formula A:B:C is given as an indicator showing the rate of increase of whorl width. Theoretically, this rate may be given by coefficients in the involute formula, but it is practically impossible to calculate these coefficients in a short time on each specimen under consideration. Thus the above-mentioned whorl formula is tested here provisionally. All measurements were carried out on figures drawn by using camera lucida.

1. *Atlanta peroni* LESUEUR, 1817

(Pl. XV, Figs. A–D, F–H)

Atlanta peroni—SMITH (1888): p. 5.
VAYSSIÈRE (1904): p. 49, Pl. VI figs. 86-89.
TESCH (1906): p. 52, Pl. VII figs. 1, 7, 8.
TESCH (1908): p. 14, Pls. 1–2 figs. 7–9.
TESCH (1949): p. 16, Fig. 9.

Long diameter	Whorl formula	Number of whorls	Number of whorls on the under-side	Aperture width: height	Apical angle
0.9 mm	1 : 0.42 : 0.23	3¾			
1.7	1 : 0.36 : 0.17	4½		1 : 0.62	135°
2.2	1 : 0.38 : 0.15	4½	2¼		
2.6	1 : 0.33 : 0.13	4¾			
2.9	1 : 0.31 : 0.12	5½	2½	1 : 0.75	
3.0	1 : 0.34 : 0.12	5	2½	1 : 0.65	
3.0	1 : 0.31 : 0.12	4¾	3¾	1 : 0.73	148°
3.1	1 : 0.32 : 0.13	4½	3		
3.1	1 : 0.35 : 0.12	4½	3		
3.2	1 : 0.30 : 0.11	4¾			
3.3	1 : 0.25 : 0.09	4½	2¼		
3.3	1 : 0.30 : 0.11	5	2½	1 : 0.67	
5.0	1 : 0.31 : 0.10	5½	3		

The insertion degree of the keel is not always proportional to the body size. The keel is not yet inserted in shells smaller than 2.2 mm in long diameter, also even in a 3 mm individual. In a 3.3 mm individual the keel encircles five-eighths of the penultimate-whorl, while in a 5 mm individual it reaches merely to 1/4 of the penultimate-whorl. Spire low, usually purplish in colour; fine longitudinal striations are observable on some spire-whorls around the centre on both upper and under-sides. Minute umbilicus may be found in some rare cases. Shell generally translucent, slightly purplish in some specimens; although it may rarely be whitish and opaque. The base of the keel and some sutures are often coloured brownish. The middle part of the inner lip is brownish in some individuals.

Occurrence: St. 2 (9 individuals), St. 12 (1), St. 19 (3), St. 20 (4), St. 27 (1), St. 28 (3).

2. *Atlanta gaudichaudi* SOULEYET, 1852

(Pl. XV, Fig. E; Text-fig. 2)

Atlanta gaudichaudi—SMITH (1888): p. 5.
TESCH (1906): p. 54, Pl. VII figs. 11–13.
TESCH (1908): p. 16, Pls. 1–2 fig. 10.
TESCH (1949): p. 17, Fig. 10.

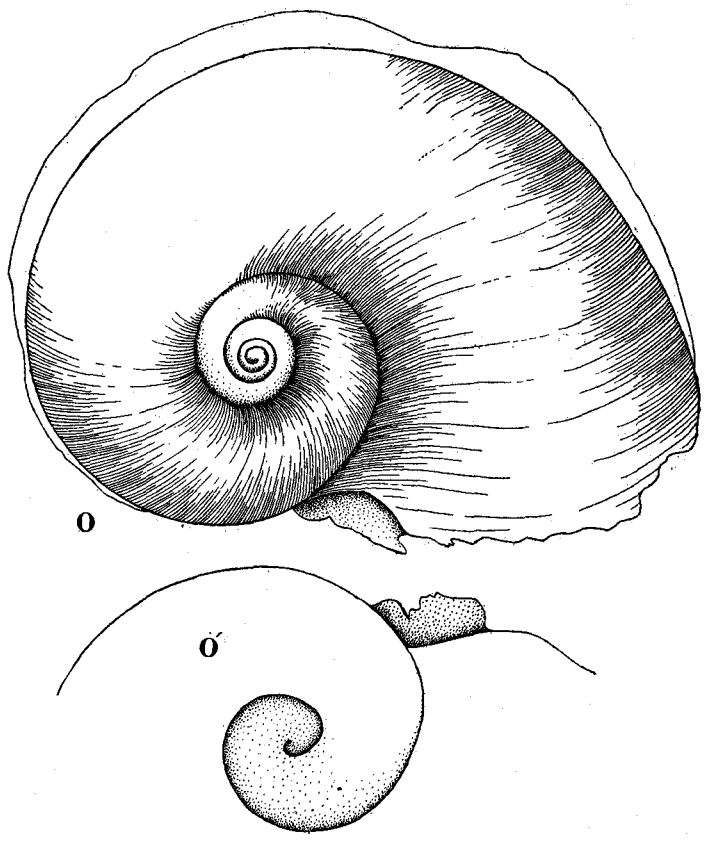

Fig. 2. *Atlanta gaudichaudi* SOULEYET. O...Specimen with 2.7 mm long diameter, O'...Under-side of the spire of the same specimen, ×33.

Long diameter	Whorl formula	Number of whorls	Number of whorls on the under-side
2.0 mm	1 : 0.26 : 0.11	4½	
2.7	1 : 0.27 : 0.10	4½	2¾

Keel low and not inserted. Shell opaque and whitish; sutures brownish and spire coloured purple.

Occurrence: St. 19 (1), St. 20 (1).

3. *Atlanta inclinata* SOULEYET, 1852

(Pl. XVI)

Atlanta inclinata—SMITH (1888): p. 6.
TESCH (1908): p. 26.
TESCH (1949): p. 18, Fig. 12.
Atlanta gibbosa—TESCH (1906): p. 59, Pl. VIII fig. 27.
TESCH (1908): p. 27, Pl. 5 figs. 33 and 34.
Atlanta affinis—TESCH (1906): p. 53, Pl. VII figs. 9–10.
TESCH (1908): p. 16.

Long diameter	Whorl formula	Number of whorls	Number of whorls on the under-side	Aperture width: height	Apical angle
0.8 mm		4¼			
1.6	1 : 0.34 : 0.27	6			86°
1.9	1 : 0.30 : 0.21	6¼	2	1 : 0.64	100°
2.3	1 : 0.29 : 0.22	6	2		
2.5	1 : 0.29 : 0.18	5¾	2		
2.7	1 : 0.27 : 0.18	6	2¼	1 : 0.80	86°
4.0	1 : 0.29 : ·····	6¾	2¾		91°

The keel is not inserted in specimens smaller than 1.9 mm in long diameter. In a 4 mm individual it encircles three-fourths of the penultimate-whorl. Small and deep umbilicus may be observed on some of the specimens. Fine longitudinal striations are seen on a whorl or three-fourths of the whorl around the centre on the underside (Pl. XVI, Fig. M) in the 2.3 mm and the 2.5 mm individuals. This striated area is sharply edged with a line which is considered as representing the mark of the keel base. Shell translucent and faintly purplish to pale brownish, or whitish in colour. Spire yellowish brown or brownish. The inner lip purplish, with a brownish hue at the middle. Spire of a 1.6 mm individual is 0.73 mm in height; a fine transverse crest-like line may rarely be found on the spire.

Occurrence: St. 2 (1), St. 3 (1), St. 10 (2), St. 12 (2), St. 13 (1).

4. *Atlanta lesueuri* SOULEYET, 1852

(Fig. 3)

Atlanta lesueuri—SMITH (1888): p. 5.
VAYSSIÈRE (1904): p. 48, Pl. V fig. 77.
TESCH (1908): p. 17, Pls. 1 & 2 figs. 11–12.
TESCH (1949): p. 17, Fig. 11.
Atlanta oligogyra—TESCH (1906): p. 54, Pl. VIII figs. 14–18.

Long diameter	Whorl formula	Number of whorls	Number of whorls on the under-side	Aperture width: height
0.6 mm	1 : 0.35 : 0.15	2½		
0.6				1 : 0.61
0.6	1 : 0.38 : 0.18	2¾		
0.7	1 : 0.25 : 0.13	2¾		
0.8				1 : 0.60
0.9	1 : 0.24 : 0.12	2¾		
0.9*	1 : 0.17 : 0.09	3¼	1¾	
1.0	1 : 0.21 : 0.10	2¾		
1.0	1 : 0.21 : 0.09	2¾	2	
1.0	1 : 0.26 : 0.11	3¼	1¾	
1.1	1 : 0.23 : 0.11	3¼		
1.3	1 : 0.20 : 0.10	3¼	1¾	
1.4	1 : 0.19 : 0.10	4	2¼	1 : 0.54
1.7	1 : 0.19 : 0.08	3¼	1¾	
1.8	1 : 0.17 : 0.09	3¼	1¾	
1.8	1 : 0.18 : 0.08	3¼	2	
1.8	1 : 0.17 : 0.09	3¾	2¾	1 : 0.64
1.9	1 : 0.20 : 0.08	3½		

* Measurements on the perfectly preserved part of the shell with ca. 1.5 mm long diameter.

Keel not inserted in specimens smaller than 1.4 mm in long diameter, even in a 1.8 mm individual. In 1.7–1.9 mm individuals it is inserted slightly. Spire very low, erected straightly or inclined very slightly; generally purplish in colour. Shell usually purplish, rarely whitish and translucent; keel colourless. Some specimens are provided with rather remarkable growth lines; inner lip purplish.

Occurrence: St. 2 (23), St. 3 (4), St. 14 (1), St. 21 (2), St. 22 (1), St. 24 (1), St. 27 (1), St. 28 (4).

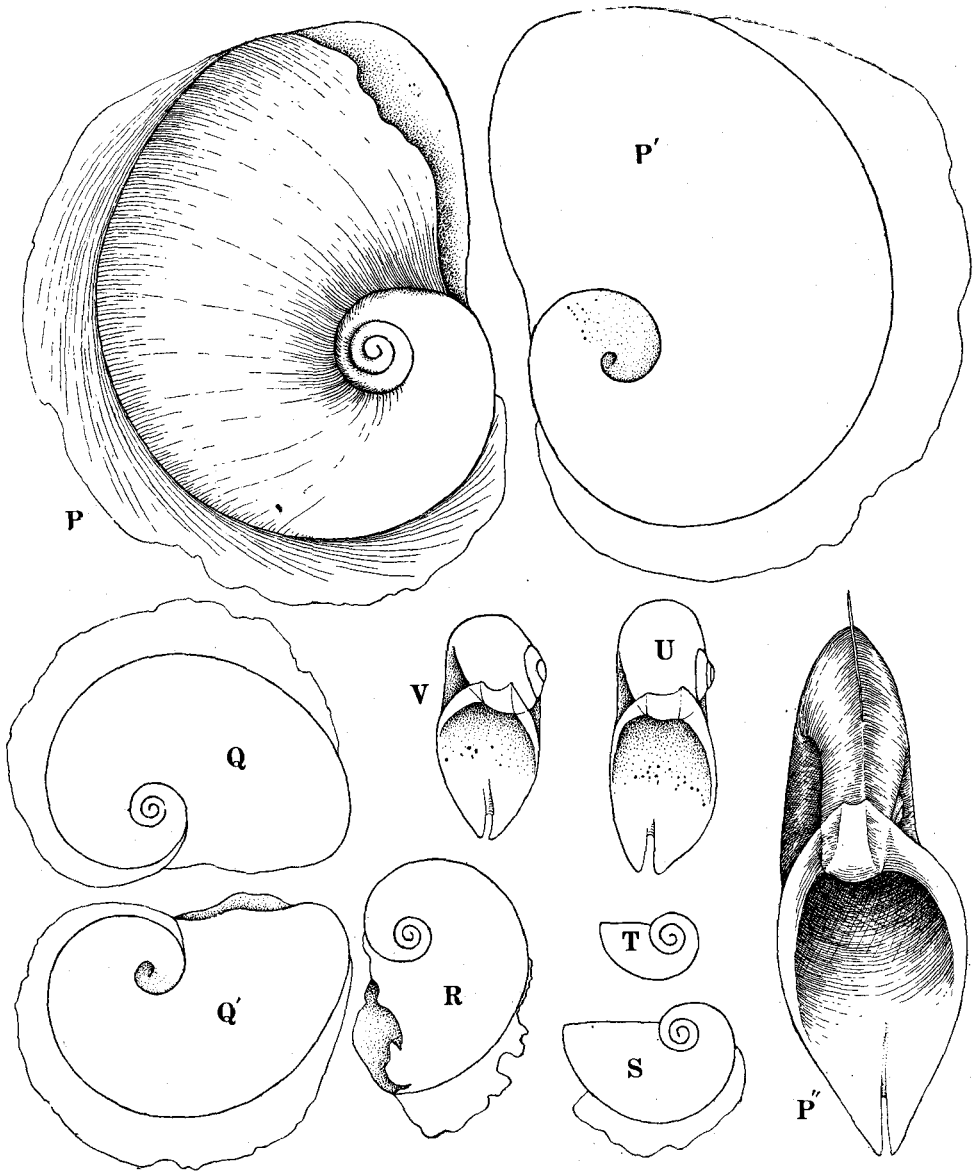

Fig. 3. *Atlanta lesueuri* SOULEYET.

P...Specimen with 1.4 mm long diameter, ×47. P′...Under-side of the same specimen, ×47, P″...Front of the same specimen, ×47. Q...Specimen with 1.7 mm long diameter, ×23. Q′... Under-side of the same specimen, ×23. R...Specimen with 1.3 mm long diameter, ×23. S... Specimen with 0.9 mm long diameter, ×23. T...Specimen with 0.6 mm long diameter, ×23. U...Specimen with 0.8 mm long diameter, front, ×47. V...Specimen with 0.6 mm long diameter, front, ×47.

5. *Atlanta inflata* SOULEYET, 1852

(Fig. 4)

Atlanta inflata—SMITH (1888) : p. 5.
TESCH (1906) : p. 55, Pl. VIII figs. 19–21.
TESCH (1908) : p. 19, Pls. 3 & 4 figs. 13–17.
TESCH (1949) : p. 19, Fig. 13.

Long diameter	Whorl formula	Number of whorls	Number of whorls on the under-side	Aperture width : height	Apical angle
0.58mm	1 : 0.55 : 0.39	4¼		1 : 1.6	113
1.4	1 : 0.30 : 0.14	5			
1.6	1 : 0.31 : 0.17	5¼	2	1 : 0.75	126

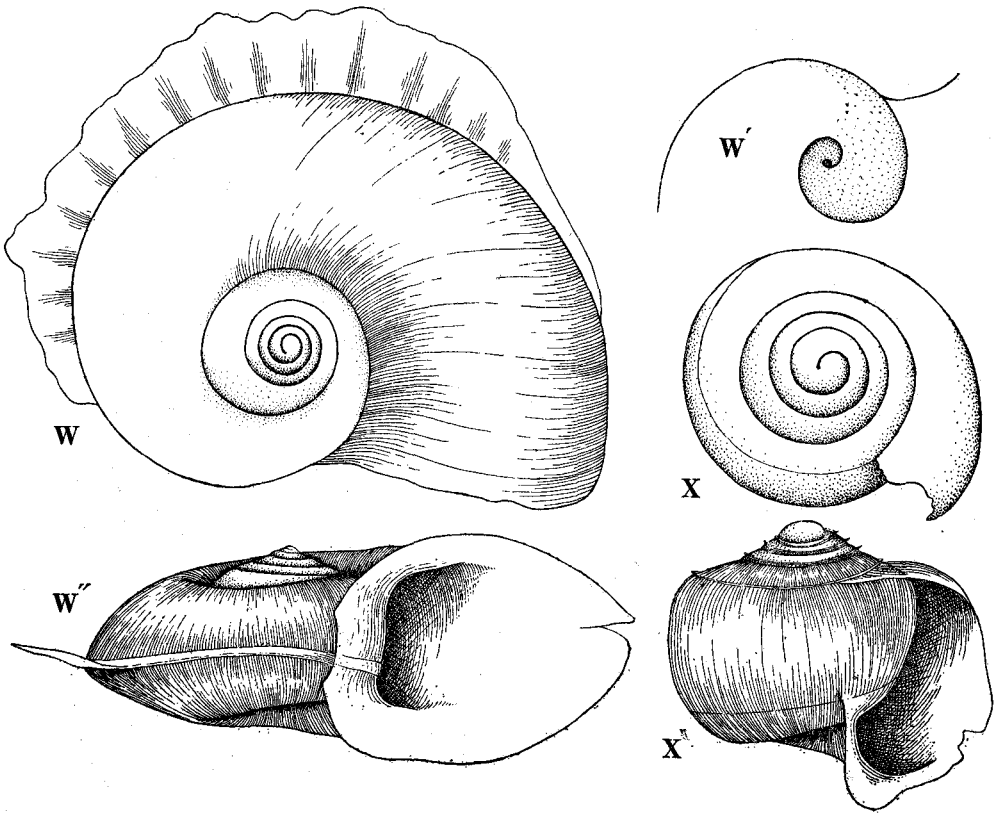

Fig. 4. *Atlanta inflata* SOULEYET.
W...Specimen with 1.6 mm long diamater, ×47. W′...Under-side of the spire of the same specimen, ×47. W″...Front of the same specimen, ×47. X...Specimen with 0.58 mm long diameter, ×73. X′...Front of the same specimen, ×73.

Keel not inserted, quite absent in the 0.58 mm individual. Slightly undulating appearance of the keel of the 1.6 mm individual is probably an unnatural feature.

Umbilicus distinct, small but deep. Spire may be slightly inclined in some specimens, it is generally dark violet in colour; protoconch rather large. On the 0.58 mm individual, two transverse ridges are found on the body-whorl one at each of the levels of upper and lower edges of the inner lip, the upper one of which is more remarkable than the lower. The penultimate-whorl has a peripheral ridge and the vepionic-whorl has a peripheral ridge and an inner marginal one. Shell usually reddish purple in colour, the clearness of the growth lines differs considerably according to the state of the preservation of specimens.

Occurrence: St. 2 (3).

6. *Atlanta turriculata* D'ORBIGNY, 1836

(Fig. 5)

Atlanta turriculata—TESCH (1906): p. 58, Pl. VIII fig. 25.
TESCH (1908): p. 24, Pls. 3 & 4 figs. 25 and 26.
TESCH (1949): p. 20, Fig. 16.

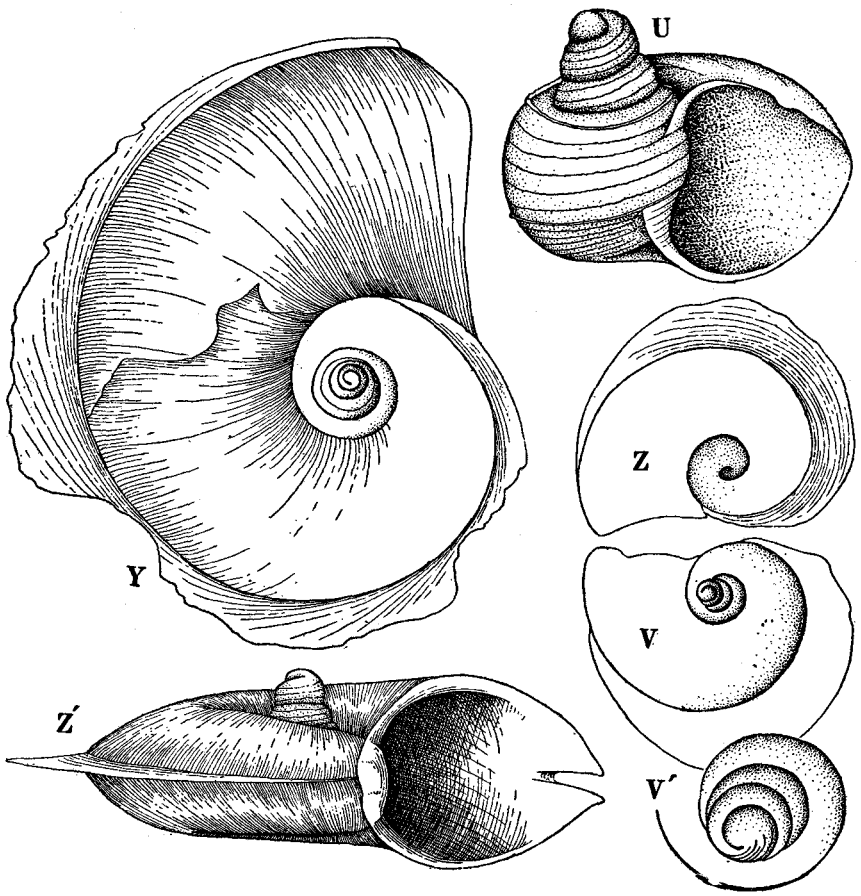

Fig. 5. *Atlanta turriculata* D'ORBIGNY.
Y...Specimen with 1.6 mm long diameter, ×47. Z...Specimen with 1.3 mm long diameter, ×23. Z'...Front of the same specimen, ×47. U...Specimen with 0.6 mm long diameter, ×73. V...Specimen with 1.3 mm long diameter, ×23. V'...Spire of the same specimen, ×73.

Long diameter	Whorl formula	Number of whorls	Number of whorls on the under-side	Aperture width : height
0.6 mm		4		1 : 1.0
1.3	1 : 0.26 : 0.14	4½	2	1 : 0.78
1.3	1 : 0.26 : 0.11	4¾	1¾	
1.6	1 : 0.26 : 0.13	5½	2¼	

Keel tall, inserted considerably in the 1.6 mm specimen, but only slightly or not inserted in 1.3 mm individuals. Spire tall and narrow, erected straightly or slightly inclined; it is dark violet to purplish brown in colour, very rarely even whitish. The under-side of the spire is also purplish brown. Fine slightly undulating transverse striations on 2–3 distal whorls of the spire, although this striations may rarely be very insignificant. The 0.6 mm individual has seven striations on the surface of the body-whorl upper than the level of the lower edge of the inner lip, of which the first and the last ones are more remarkable than others; besides 6–8 much finer striations on the under-side of the body-whorl, 4 on the vepionic-whorl and 3 on the penultimate-whorl. Shell usually lilac in colour, inner lip purplish.

Occurrence: St. 2 (5), St. 3 (1), St. 27 (1), St. 28 (1).

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EXPLANATION OF PLATES XV–XVI

PLATE XV

Figs. A–D, F–H. *Atlanta peroni* LESUEUR.

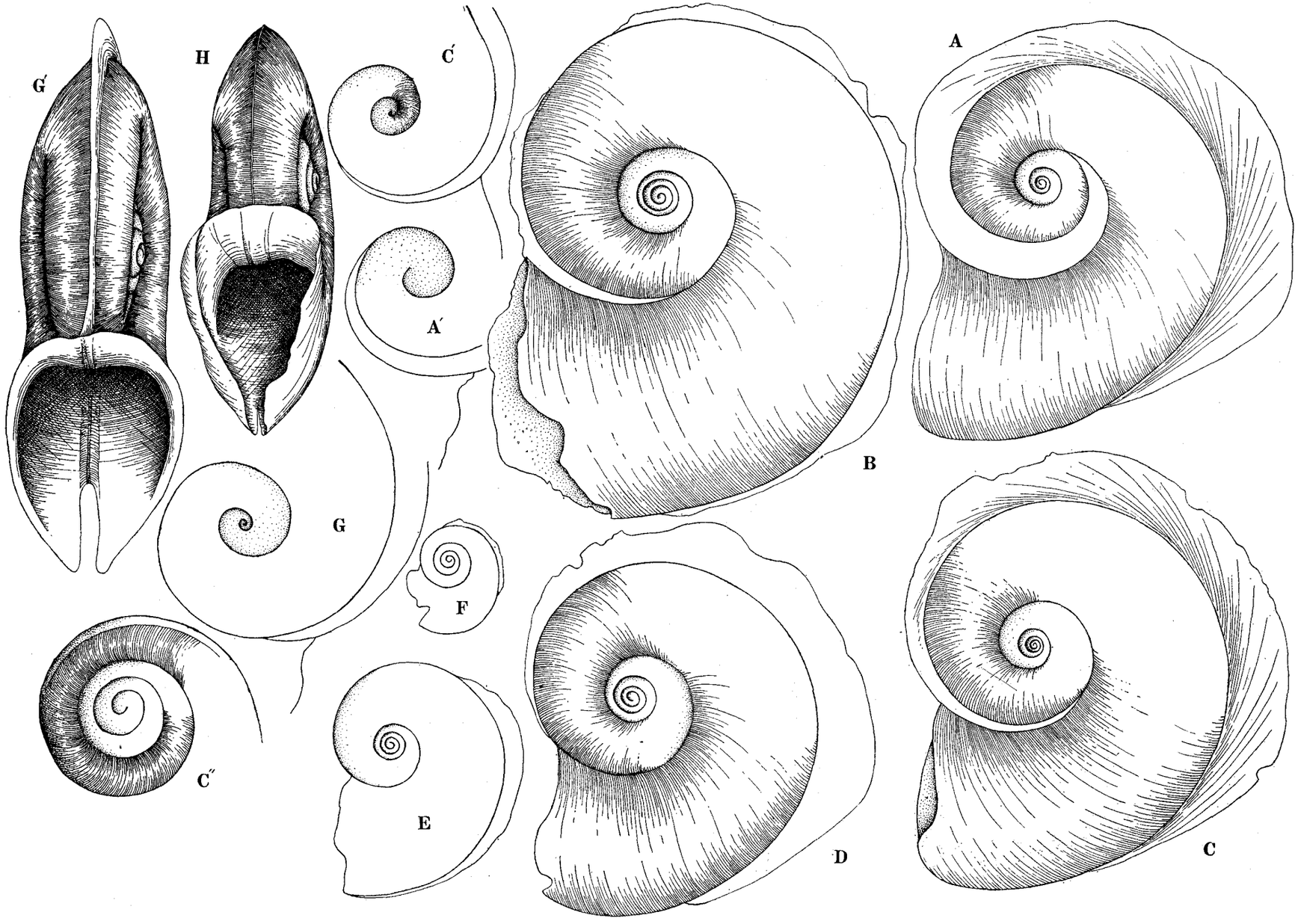
A ...Specimen with 3.3 mm long diameter, ×23.
A′ ...Under-side of the spire of the same specimen, ×23.
B ...Specimen with 2.9 mm long diameter, ×33.
C ...Specimen with 5.0 mm long diameter, ×15.
C′ ...Under-side of the spire of the same specimen, ×15.
C″...Spire of the same specimen, ×73.
D ...Specimen with 3.0 mm long diameter, ×23.
F ...Specimen with 0.9 mm long diameter, ×23.
G ...Specimen with 3.0 mm long diameter, under-side, ×33.
G′ ...Front of the same specimen, ×33.
H ...Front of the specimen with 1.7 mm long diameter, ×47.

Fig. E. *Atlanta gaudichaudi* SOULEYET...Specimen with 2.0 mm long diameter, ×23.

PLATE XVI

Figs. I–N′. *Atlanta inclinata* SOULEYET.

I ...Specimen with 4.0 mm long diameter, ×23.
J ...Specimen with 1.9 mm long diameter, ×47.
J′ ...Front of the same specimen, ×47.
K ...Specimen with 1.6 mm long diameter, ×47.
L ...Front of the specimen with 2.7 mm long diameter, ×33.
M ...Under-side of the spire of the specimen with 2.3 mm long diameter, ×33.
N ...Specimen with 0.8 mm long diameter, ×47.
N′ ...Under-side of the spire of the same specimen, ×47.



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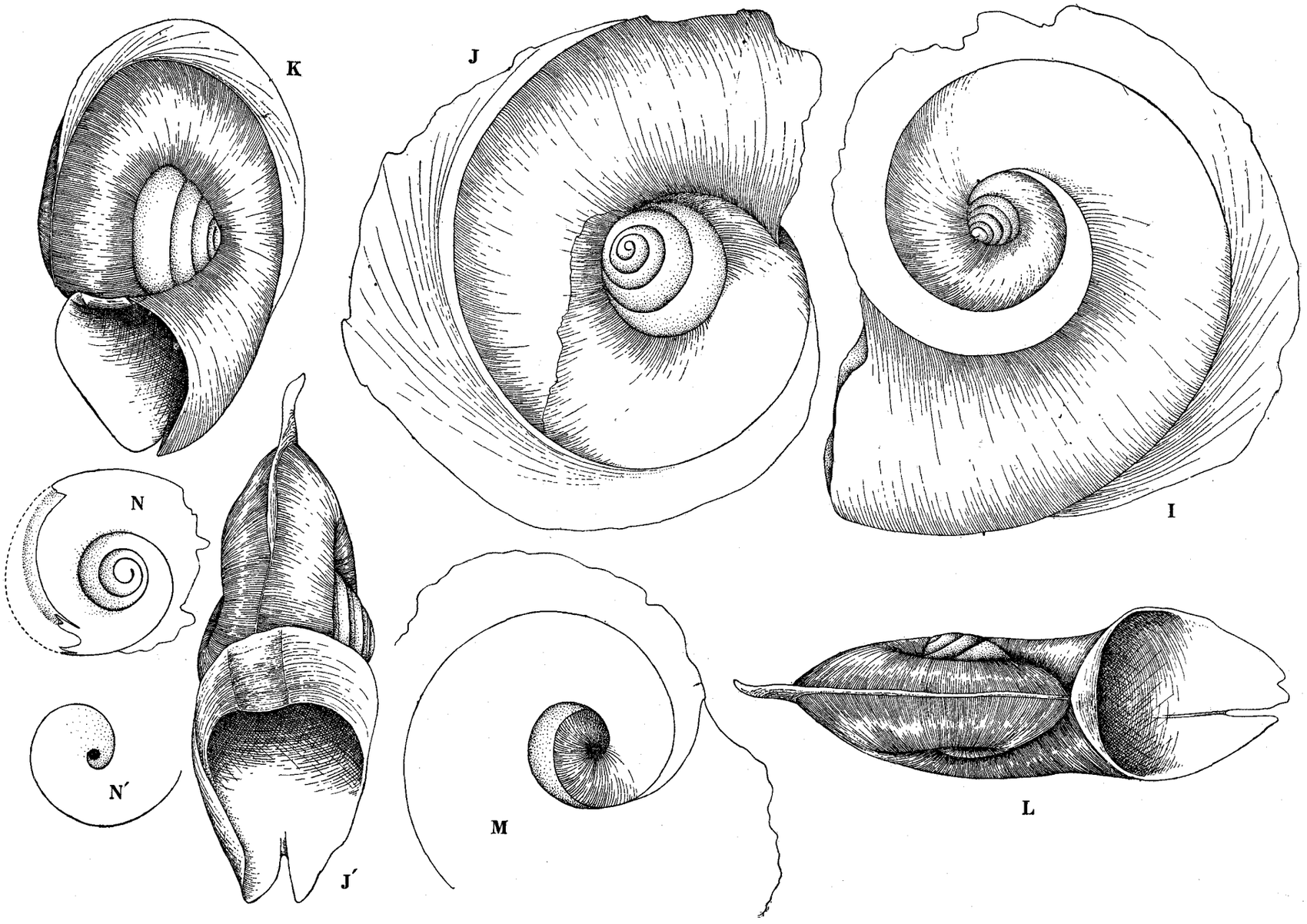

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